Professional issue

Complexity in the physiotherapy management of low back disorders: Clinical and research implications

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Over the past decade a wide variety of approaches for the management of low back disorders (LBD) have been developed and evaluated in clinical trials. As a consequence physiotherapists and researchers interested in LBD are faced with a range of issues to do with complexity. These issues will be explored and suggestions made to improve the delivery of high quality research evidence and better patient outcomes.

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1. Introduction

Physiotherapists are an important service provider in the management of LBD. Presumably physiotherapists have a belief that their treatment is effective but this contention is not strongly supported by the research literature (Koes et al., 2010). This paper aims to explore the impact of complexity on the physiotherapy management of LBD from a clinical and research perspective.

2. Complexity in clinical and research practice

Inherent in the large repository of clinical knowledge and associated methods for managing LBD (Koes et al., 2010; Delitto et al., 2012) is complexity. For example, 122 hours of post-graduate training is recommended to attain proficiency in the McKenzie method (The McKenzie Institute Australia, 2012). Basic application of the Maitland style of manual therapy (Jones and Rivett, 2004; Maitland et al., 2005) is also a complex task requiring:

- A conceptual understanding and ability to practically apply hypothetico-deductive reasoning
- Knowledge and practical skills to perform a large number of clinical techniques
- An understanding of complex concepts such as movement diagrams and grades of motion
- An ability to identify the relationship between symptoms when different techniques are applied
- A significant degree of measurement rigour in reassessing the effect of treatment

Physiotherapists who use methods such as the McKenzie and Maitland approaches (Foster et al., 1999; Jackson, 2001; Li and Bombardier, 2001; Gracey et al., 2002; Byrne et al., 2005) face further complexity when considering the influence of a range of additional relevant factors. To this end pathoanatomical, impairment, psychosocial, neurophysiological and genetic factors (Ford et al., 2007; O’Sullivan, 2012) as well as the patient’s perspective (Jones and Rivett, 2004) all need consideration.

Given this complexity it is not surprising that a large number of variable and somewhat mutually exclusive management methods for LBD have been developed. Recent reviews of the classification literature show over 80 different subgrouping systems (Ford et al., 2007; Fairbank et al., 2011; Karayannis et al., 2012). There are some commonalities between the classification approaches of McKenzie and May (2003), Petersen et al. (2003) and the author’s group (Ford et al., 2011a) as well as between the methods of O’Sullivan (2005) and Sahrmann (2002). However, there is less overlap between many other classification approaches including recent recommendations from Fritz et al. (2007), the Start Back group (Hill et al., 2011) and psychological based classifications (Bergstrom et al., 2012). An even wider array of treatment approaches have been described in the
RCT literature. In the author's recently published systematic reviews 41 conservative treatment types attempting to specifically target a LBD subgroup were identified (Hahne et al., 2010; Slater et al., 2012; Surkitt et al., 2012; Richards et al., in press). The number of treatment types in randomised controlled trials (RCT) investigating non-specific treatment is likely to be far greater.

Large survey's show that this variability in classification and treatment methods observed in the research literature is also present in clinical practice (Jackson, 2001; Kent and Keating, 2005; Spoto and Collins, 2008; Liddle et al., 2009). In theory clinical reasoning is a strategy of value in interpreting and processing large amounts of theoretical and clinical information into effective treatment planning (Jones and Rivett, 2004). However, a range of clinical reasoning approaches are used by physiotherapists (Jones and Rivett, 2004) which are in themselves complex to apply and challenging to learn, particularly for novice practitioners (Gobet and Borg, 2011; Davies and Howell, 2012).

3. Physiotherapy for low back disorders – craft or profession?

The authors propose that complexity has had an impact on external perceptions and internal realities regarding the nature of physiotherapy and in particular manual therapy for LBD. Sections of the medical community (Bogduk, 1996; Buchbinder, 2009) have described physiotherapists practicing manual therapy as a “craft” group defined as an occupation “involving skill in making things (in this case treating patients) by hand” (Oxford Dictionaries, 2012). This view contrasts starkly with common descriptions of physiotherapy as a professional group founded on evidence-based principles (American Physical Therapy Association, 2001; Herbert et al., 2005; Delitto et al., 2012; Little and Davenport, 2012). An evidence-based approach encompasses integration of the best available evidence, clinical expertise and patient values with regards to clinical decision making (Sackett et al., 2000). Within the context of complexity, the question of physiotherapy as a craft or professional group warrants exploration.

Physiotherapists are potentially unique in their capacity to manage LBD by combining high level theoretical knowledge and manual skills within a biopsychosocial context (American Physical Therapy Association, 2001). However there is large variability in manual therapy standards in clinical practice (Boissonnault and Bryan, 2005; Sizer et al., 2007; Davies and Howell, 2012) despite efforts to develop recognised minimal competency levels (International Federation of Orthopaedic Manipulative Physical Therapists, 2008). Some developers of methods for managing LBD have demonstrated a selective engagement with the evidence base. An example of this is the recent trend of excluding pathoanatomical conditions from clinical protocols for LBD (Sahrmann, 2002; Fritz et al., 2007; Macedo et al., 2010) despite a likelihood that concepts such as tissue healing are important for developing effective treatment (Adams et al., 2010; Hancock et al., 2011; Ford and Hahne, 2012). Similar themes are evident in classification systems not accounting for psychosocial and/or neurophysiological factors (Ford et al., 2007; Fersum et al., 2010). Others have expressed strong reservations on the value of randomised controlled trials for evaluating effectiveness of treatments (Clemence, 1998; Downing and Hunter, 2003; Milanese, 2011). These examples, in addition to the variable and poorly integrated knowledge base already described, are incongruent with professional group status as depicted in Fig. 1.

Such considerations may not sit comfortably for many physiotherapists who pride themselves on providing the highest quality of care. Indeed, these comments on craft group status cannot be broadly applied as different physiotherapists from different jurisdictions are likely to rate differently on the craft versus professional group continuum (Boissonnault and Bryan, 2005; Sizer et al., 2007). However, physiotherapists should be aware of the potential impact of certain behaviours on shaping the external perception and internal reality of the profession (Jette, 2012).

It is the authors' view that behaviours by some physiotherapists and researchers tending towards craft group status are strongly driven by the complexity of LBD. Predominantly this appears to relate to the difficulties in systematically identifying, interpreting and integrating all relevant research and clinical knowledge as well as a disconnect between clinicians and researchers around the world. Therefore, a major challenge for the profession is to respond in a coherent and integrated manner to positively deal with the issue of LBD complexity.

4. Clinical practice implications

The authors believe physiotherapists should be cognizant of the impact of complexity on clinical practice and resolve in aiming to adhere to professional group standards. Suggestions to assist this process include practitioners:

- Establishing a sound foundation of knowledge and minimum level practical skills across the range of commonly used LBD management methods (e.g. Maitland and McKenzie methods)
- Extending this foundation to incorporate the assessment and appropriate management of the multiple dimensions relevant to LBD (e.g. patoanatomical, impairment, psychosocial, neurophysiological and genetic factors) as well as the patient's perspective
- Appreciating the importance of a systematic approach to organising complex bodies of knowledge (Jette, 2012) and engaging with reasonable attempts to do so (Delitto et al., 2012)
- Integrating new innovations for managing LBP with the practitioner's existing knowledge and skill foundation rather than substituting "old for new"
- Purposeful endeavours in the clinic to improve clinical reasoning skills as a means of dealing with complexity (Jones and Rivett, 2004; Davies and Howell, 2012)
- Carefully considering the best available evidence (from all types of research, not just RCT) in the context of the practitioner's clinical experience and the patient's perspective

![Fig. 1. The continuum between craft and professional group status.](image-url)
In dealing with the complexity of LBD, the experience of the authors is that practitioners, particularly those with less experience, appreciate and benefit from structured and systematic clinical mentoring (Ford et al., 2011a, 2011b, 2012a, 2012b). This approach sets a level of minimum competency that can then be further developed independently and includes:

- The use of thorough and systematic assessment templates and tools supported by a multi-dimensional classification system
- Detailed clinical protocols outlining the necessary requirements of LBD management methods
- Clinical decision making algorithms to assist in tailoring of treatment to the patient (Helmhout et al., 2008; Foster and Delitto, 2011) thereby avoiding a "one size fits all" approach
- Formal clinical mentoring with regular review of patient progress and practitioner feedback

Research has demonstrated the difficulty in engaging practitioners with evidence-based practice (Stevenson et al., 2006). The experience of the authors is that structured clinical mentoring utilising a systematic method of knowledge organisation is an effective method of changing practitioner behaviour in accordance with the evidence.

5. Research implications – the importance of classification

The issue of LBD complexity has significant research implications. A pragmatic approach to RCT design favours choices that maximise applicability of results to “the real world”. As such minimal restriction is placed on participant eligibility or prescriptive operationalisation of the treatment applied (van der Windt et al., 2008; Zwarenstein et al., 2008). In an ideal world where a pragmatic RCT demonstrates treatment effectiveness, issues of complexity can be considered as irrelevant, and broadly applicable clinical recommendations can be made (van der Windt et al., 2008). Pragmatic designs are commonly used in RCT for LBD but the results have not found evidence supporting the effectiveness of physiotherapy (van der Windt et al., 2008).

Many have postulated that the complexity of LBP needs to be accounted for in RCT by improved subgrouping or classification (Ford et al., 2007; Fairbank et al., 2011; Karayannis et al., 2012). Sample heterogeneity can diminish the chance of finding a significant treatment effect due to the reduced proportion of the sample for which the treatment is appropriate. Recruiting participants that belong to a homogenous subgroup who receive matched and specific treatment is more likely to demonstrate effectiveness due in part to a reduction in the clinical complexity the practitioner has to address.

Over the last decade a number of classification based trials have been published, although to date the results have been mixed (Slater et al., 2012; Surkitt et al., 2012). Given the number of classification and treatment approaches available for physiotherapists, informed decisions must be made regarding further research in this area. Data from a range of surveys suggest that physiotherapists most commonly employ manual therapy, the McKenzie approach and motor control retraining when treating LBD (Foster et al., 1999; Jackson, 2001; Li and Bombardier, 2001; Gracey et al., 2002; Byrne et al., 2005). Despite the publication of hundreds of RCT to date, these popular methods of managing LBD have not been adequately evaluated for efficacy in a manner consistent with clinical practice and in accordance with classification principles (Slater et al., 2012; Surkitt et al., 2012; Ford et al., 2012b). An additional consideration is the fact that most clinicians incorporate a variety of methods when managing LBD. Clinical trials need to reflect this complexity by evaluating multi-modal management approaches, despite the potential limitations in not being able to attribute effect to one specific treatment component (Jull and Moore, 2010). Once evidence of effectiveness is identified, specific components of the management method can be subsequently evaluated in new RCT.

Prioritising the validation of commonly used classification and specific treatment methods does not negate the necessity for clinical trials on emerging approaches for LBD. However, it does provide a focus that maximises the capacity of the physiotherapy profession to successfully build upon the existing knowledge foundation using evidence-based principles.

6. Research implications – treatment integrity

Treatment integrity refers to the degree in which an intervention is delivered as intended. Even with significant training, treatment integrity in RCT can vary substantially particularly if the treatment is complex to administer (Borrelli et al., 2005; Helmhout et al., 2008; van der Windt et al., 2008). Low treatment integrity increases the risk of false conclusions being drawn regarding effectiveness due to the treatment being inadequately applied to participants. A variety of methods to improve treatment integrity have been described and should be carefully considered during RCT planning (Borrelli et al., 2005; van der Windt et al., 2008). These methods, particularly when combined with classification principles, enable complex management methods to be appropriately evaluated in an RCT setting.

Treatment design considerations necessitate a clearly defined theoretical model with associated practical detail described in clinical manuals (Craig et al., 2008; Helmhout et al., 2008; Foster and Delitto, 2011). Expert practitioners should develop these. Algorithmic approaches to clinical decision making should also be used to maximise specificity and adaptability of the clinical protocol to participant presentation (Milanese, 2011). In the authors’ recent RCT (Hahne et al., 2011) the use of session by session, structured clinical notes with specific cuing regarding algorithmic assessment and treatment process was a helpful strategy. Detailed information sheets were also valuable, as the process of explaining these resources to the participant reinforced critical treatment components in the physiotherapist’s own mind.

Training of practitioners is an important component to treatment integrity and should be of an appropriate duration for the complexity of the intervention being evaluated. For example, the physiotherapists in the Start Back trial (Hill et al., 2011) received nine days of training in order to be competent in providing “psychologically informed physiotherapy” to participants at high risk of a poor outcome. The training included teacher lead sessions, group discussion, role play and interviewing of simulated patients (Main et al., 2012).

Delivery of treatment should be an audited process with constructive feedback provided to the trial physiotherapists. In a trial completed by the authors this feedback was provided at weeks three and seven of a 10 week program and also used monthly telephone hook ups to discuss difficult cases (Hahne et al., 2011). Evaluation of treatment integrity at the participant level can also be a useful strategy (Borrelli et al., 2005).

7. Research benefits of classification and treatment integrity measures

The issues associated with the complexity of LBD can be substantively ameliorated in RCT that recruit homogenous LBD subgroups, apply a matched and specific treatment and employ adequate treatment integrity measures. In such trials, the likelihood of the trial demonstrating results favouring physiotherapy treatment is increased. Robust classification and treatment integrity measures also enable other researchers to more precisely replicate trials with positive findings. A more detailed description of classification and treatment procedures reduces the risk of systematic reviews erroneously pooling the results of clinically heterogeneous RCT for the
purposes of meta-analysis. Finally, these measures allow clinicians to more easily interpret and replicate the management approach thereby improving engagement with evidence-based practice and translation of results to the clinical setting. However, despite these benefits, few RCT or systematic reviews have adequately addressed classification and treatment integrity issues (Hahne et al., 2010; Slater et al., 2012; Surkitt et al., 2012; Richards et al., 2012).

8. Conclusion
Physiotherapists working clinically and in research settings as well as the profession as a whole should be aware of the challenges LBD complexity brings to an evidence-based approach. The recommendations of this paper should assist clinicians and researchers in collaboratively working to overcome complexity issues and deliver high quality research evidence and better patient outcomes.

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